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Attachment

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# THE CHANGING WORLD FOOD SITUATION - A CGIAR PERSPECTIVE*

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## Introduction

Mr. Chairman, members of the Consultative Group, fellow Center Directors, and other colleagues. It is a great privilege to have this opportunity to present to you a set of perspectives on the world food situation. The External Program Review for IFPRI, noting the dynamic nature of the global food scene, urged that once every two years the Director of IFPRI draw upon the accumulated knowledge of the Food and Agriculture Organization of the United Nations (FAO), the World Bank, the CGIAR itself, and other organizations and individuals to present information and to suggest conclusions that would be helpful in stimulating thought and action consistent with the objectives and means of the CGIAR system. The Review Team, while noting the need for cautious qualification of economic research, encouraged the Director of the Institute to extrapolate research findings to the specific questions raised by policymaking bodies, including this one. I will attempt that task, albeit with some trepidation.

This is a particularly appropriate time to take stock of the world food situation from a CGIAR perspective. Major changes have occurred since the initiation of the CGIAR system and its early years of explosive growth. I will emphasize three changes that have been with us long enough for their presence to be clearly defined but that are new enough for there to be some uncertainty about how to deal with them.

First is the swing from Asia to Africa as the area of greatest concern with respect to growth in food production. Second is the extraordinary growth in food exports of the developed countries, including the emergence of the European Community as a major food

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exporter. Third is the continued existence of massive malnutrition and poverty, particularly in Asia, in the face of major improvements in food production growth rates. All three drive home the extraordinary increase in complexity of the world global food scene over the past few decades and offer major challenges to the performance of the CGIAR system. I will dwell particularly on the problems of Africa which are of most immediate concern.

## The Rise of Africa as the Major Food Problem Area

Asia dominated Third World food imports during the period of the CGIAR's conception and early growth. The potential size of imports into the region and the implications of a chaotic political situation consequent to large-scale food shortage in an area with such vast numbers of people suggested a clear danger on the food front. We can also see now that a major increase in food prices and also probably production instability were then in process. The forces of instability not only led to greater concern for food security but also focused more attention on raising food production growth rates in Asia. Fortunately, by that time it was clear that the soils, climate, and nature of the dominant crops were propitious for major scientific breakthroughs.

The change in production trends for basic food staples in Asia from the decade of the 1960s to the decade of the 1970s is striking. The food production and yield growth rates increased by more than one-fifth. The area growth rates increased by one-quarter. It is likely that the large boosts in yields favored further investment in irrigation and increased double cropping: thus yield growth fostered, not substituted for, area growth. This substantial acceleration reflects the success of modern high-yield varieties and the systems that created them. The preponderance of evidence is that the processes that produced these accelerated trends are being institutionalized and thus can be expected to continue. It is of course important that we all continue to work to see that this is the case.

The simply drawn challenge for the 1960s was successfully met. The analogous challenge for the 1980s lies in Africa. A comparison of Africa and Asia in the 1960s and 1970s describes this challenge. In Africa, in the 1970s compared to the 1960s the growth rate for area expansion dropped by more than half, the yields did not change significantly in either decade, and the production growth rate declined by more than three-quarters. In the 1970s the food production growth rate was less than half the population growth rate. It is particularly notable that in land-rich Africa in the 1960s, area devoted

to food crops grew three times faster than in Asia, while in the 1970s the growth rates for the two regions were about the same. There was a sharp rise in the rate for Asia and a dramatic decline in Africa.

Tremendous increases in food imports into sub-Saharan Africa are readily understood considering the continent's poor food production record. With food exports declining at an annual rate of nearly 5 percent and imports increasing at more than 7 percent, sub-Saharan Africa moved in a little more than a decade from a net exporter of food to a significant net importer and, extrapolating present trends, by the year 2000 imports will be massive. Trade data, which are generally believed to be more accurate than production data, are generally consistent with the production trends described.

In focusing on food production in Africa, major uncertainties and differences must be faced compared to Asia in the 1960s. First, in the late 1960s there was little controversy as to the efficacy of a major push on food production in Asia. For Africa now, there is considerable controversy about the advantage of food production compared to export crops (see, for example, the World Bank's Agenda for Action). Second, for Asia the need for technological breakthroughs was clear. There was a full expectation that new technology could concurrently meet production and equity objectives, and the broad outlines of the technological answers were generally agreed upon. For Africa, agreement on the nature of the technological breakthroughs needed is less clear, and so the focus on a technological answer is less sharp. Third, in Africa there is commonly less agreement on what regions a food production breakthrough is most likely to occur in and less inclination to face the political problems that must be solved in order to emphasize those regions. And fourth, Africa is more subject to labor constraints than Asia, thereby posing a much more complex research problem. Each of these four problems diffuses the focus on food production research and must be put into appropriate perspective if success is to occur.

As I expand on the severe problems of African food production it must be kept in mind that our base of knowledge, not only of science but also of institutional needs, is much greater than in the late 1960s. Hence today's more serious problems may prove more manageable than yesterday's somewhat easier ones, if we diagnose the problem correctly and apply ourselves.

The average productivity of smallholder labor in food production in Africa seems markedly lower than in Asia. This conclusion is supported by some evidence of a relatively smaller cultivated area of foodgrains per labor force hour, compared to other developing areas.

The labor inputs for many areas of Africa are close to those for India, but there is much less irrigated area in Africa, the soil is less fertile, and less fertilizer is used. Low labor productivity in agriculture helps account for the unusually high rural-urban wage differential in Africa. Because the value-product of African labor is generally higher in export crops, it can be argued that it might be better for Africa to specialize in these commodities. It is not an argument to be dismissed lightly given the generally low productivity of resources in food production.

Four points need to be kept in mind in dealing with this argument. First, given the risk aversion common to farmers, the extent to which they are willing to put their resources in export crop production is determined by their ability to produce adequate home food supplies. Thus food production and export production may be complementary, not competitive; increased productivity of the former allows increased production of the latter. Second, a substantial proportion of African labor resources are already in food production. Failure to substantially raise the productivity of these resources in food production means leaving large numbers of people in poverty and malnourishment for the decades required to facilitate a shift to alternative production and distribution systems. Third, and leaving behind the second point, there is great variability from place to place in the food production resource base in Africa. Although the comparative advantage argument against food production may apply in some areas, it seems unlikely in others. Fourth, no government, given reasonable prospects of success in domestic food production, will import the bulk of its basic food sustenance.

The possibility of major technological breakthroughs in Africa now seems far less likely than in Asia in the 1960s, if for no other reason, because Asian agriculture was dominated by young soils and the prospect of good water control, whereas Africa is dominated by old soils with little prospect of good water control for decades. In Asia, in the late 1950s, when it began to be recognized that a solution to the food problem required concentration on the better areas, there was little disagreement about that choice in principle or in practice in delineating those areas (see, for example, the 1959 Ford Team report on India). In Africa, the principle is yet to be widely accepted and the difficult task of developing the knowledge base for delineating the regions where success is most probable has hardly begun -- to say nothing of addressing the complex political problems implicit in such policy.

In Asia, one key resource has generally been abundant -- labor. If more labor is needed to raise yields, it will be available with only modest reorganization or introduction of mechanical aids. In

Africa, labor productivity is much lower than in Asia and seasonal labor bottlenecks act as an unusually severe constraint to production growth. It seems that in Africa not only is the productivity of labor in food production lower than in Asia, but the number of hours worked each year may be less due to the extreme seasonality of labor requirements. Indeed, the simple comparative advantage model to the contrary, tight seasonal bottlenecks in producing the basic food supply severely constrain growth in export crop production as well. To oversimplify, with the exception of countries such as Ethiopia and Kenya, Africa might best be described as land surplus in the same manner that Asia is described as labor surplus. That is certainly not to say that biological scientific research is not the answer, but that it may be more difficult to focus that research than in Asia. One should note that Africa's poor record on food production is largely due to the labor constraint combined with rapid urbanization, rising urban incomes, and rising remittances to rural areas. These all serve to reduce labor input into agriculture, slowing the expansion of area cultivated as well as of yields per acre. These same forces have a much less negative impact on agriculture under the labor surplus regimes of Asia.

What might we conclude from this analysis about Africa? First, the difficulty of the problem is not cause for despair, but only indicates the urgency of making difficult choices and acting upon them. There is no question that food production growth rates can be greatly accelerated in sub-Saharan Africa. It is worth adding that if we had faced the problem of Africa before those of Asia, we would also be enumerating differences between the two, but we would be pointing out the difficulties of moving in Asia because of the lesser experience with those circumstances.

Second, the elements of truth in the argument for the comparative advantage of export crops and the low labor productivity in Africa both point to technological change as the basis for improvement in the food record. The generally small response to rapidly rising real food prices in much of Africa confirms this. Policy changes probably can bring significant increases in output, particularly in the export sectors and for commodities for which output has actually declined. But in a few years that potential, insofar as it proves to exist, will be reached and new technology will be the only remaining answer.

Third, technological research, at least for a major portion of Africa, must focus substantially on labor productivity. The urgency of the situation calls for attention to all possible means of raising labor productivity, particularly during seasonal peaks. These might include changes in crop labor profiles, the combination of crops,

chemical and mechanical innovations, as well as basic increases in yields. A close integration of mechanical with biological research seems called for, as does an effort to facilitate cultivation of larger areas per unit of labor. This emphasis on raising labor productivity is of course in no way a call for large-scale farming. In fact, since the effort needed is an overall increase in labor productivity, not a dualistic pattern of raising productivity for just a few, the call is for small-scale farming. Given the very low productivity of labor in food production in Africa relative to urban incomes and to labor productivity in agriculture elsewhere in the developing world, the improvements must be major to have a significant effect on production: marginal changes will not meet the challenge. This assertion has significant implications to research allocations.

Fourth, precisely because marginal changes will not be enough and because of the difficulty of the environment, hard decisions must be made about research resource allocations as well as about food production generally, as to where the most likely payoffs will occur. These decisions must be by commodity as well as by region and subregion. The regional choices will also relate to the physical situation of the soil and the amount of rainfall. Needless to say, as breakthroughs occur in the easier situations, research will be needed to push out into the more difficult areas. The faster research resources expand, the faster that broadening effort can occur. In the meantime complex political adjustments will have to accompany these hard decisions. It is perhaps particularly necessary to be explicit here: all these priorities have powerful political implications and can only be effective if implemented through the political processes of each country. The problem of regional choices is inevitable, and it is already being made in a number of situations but often with inadequate information. The foreign assistance community can help to extend the capacity to generate and use the necessary information within national institutions.

Finally, as new technologies profitable to African smallholders are developed, many ancillary policies must be implemented. The extraordinary cost of food transport in Africa, typically double that of Asia, means large investments in infrastructure are needed. The need is reinforced by the substantial deficiency in food supplies in rural areas in bad years, which interacts with the labor constraint to reduce the next years output. Although migration of labor in poor crop years is no doubt a factor, undernutrition may prove important as well. In Africa even more than in Asia the capacity to provide food security in rural areas is needed and that requires good infrastructure. Similarly, the inefficiency of marketing institutions in much of Africa reduces farm prices by major proportions: reform is essential.

African soils are extremely low in nutrient content; hence fertilizer must play a larger role than in Asia. Hard decisions about regional allocation of fertilizer distribution facilities must be made. And, priority must also be given to complementary policies necessary for rapid adoption of new technologies.

These are tremendous challenges. They are surely more difficult than the ones faced two decades ago in Asia. But surely our much greater scientific and practical knowledge gives us the capacity to surmount these problems over the next two decades.

## The Food Export Capacity of Developed Nations

There has been extraordinary growth in cereal shipments from developed to developing countries. They increased nearly fivefold from the early 1960s to the late 1970s and can be expected to increase another four or fivefold by the end of the century. Three forces are at work: first, extraordinary growth in commercial demand in the rapidly prospering countries of North Africa/Middle East, Latin America, and Asia; second, rapid increase in demand in the face of urbanization fueled by oil and foreign aid in Africa; and third, virtual cessation of growth in per capita food consumption in the developed countries.

Both the import demand and the export supply are large. The balance between these powerful forces is necessarily highly unpredictable. At the time of the formation of the CGIAR there was widespread doubt whether the burgeoning demand for imports, particularly in Asia could be met. The world experienced a crisis of extraordinarily low cereal stocks in the mid 1960s and again in the mid 1970s. Real cereal prices had been trending up in the 1960s and then experienced a very sharp rise in the mid 1970s. Now, a decade later the concern is quite the opposite. Can adequate markets be found for rapidly growing developed-country surpluses? For almost a decade cereal stocks have been large and real prices low. The European Community has emerged as a major and rapidly growing net exporter of cereals, perhaps rising to 25 million tons of net exports by 1990. In Europe as in North America growth of cereal demand has virtually ceased, while continued productivity growth has been institutionalized. Rapidly growing exports, sharply lower prices, or both seem inevitable. In fact, the dynamics of demand for food, during the period 1961-1977 is usefully illustrated by the fact that the European Community had a production growth rate two-thirds that of East Europe and the USSR, but the former was accelerating exports while the latter were increasing imports. In this period, food consumption was growing

by 3.5 percent a year in East Europe and the USSR, compared to 1.1 percent in the European Community. In the Eastern Bloc, growth in demand for food has not yet leveled off.

It is not surprising that questions should be raised in developed countries about the efficacy of accelerating food production growth rates in the potential food markets of the developing countries. These questions have profound implications to the financing of the CGIAR. It is vital, however, to the interests of food exporters to recognize (1) that their major market is in developing countries; (2) that the growth of these markets is a function not just of the overall growth rate in these countries but of the extent to which lower-income people share in that growth, because they are the ones who spend their additional income on food; and (3) that it is growth in the domestic food production sector that spurs broad participation in growth. Thus, although it may seem odd, it is to the interest of food exporters that agricultural production in the low-income countries grows rapidly and hence, and I emphasize this, to the interest of developed country exporters to foster accelerated agricultural growth in low income developing countries. A few statistics will help demonstrate this.

For the period 1961-77 Latin America has had the fastest growth rate of staple food production of the major continental areas (3.2 percent), but consumption has grown more rapidly (3.6 percent). Latin American net staple food exports have declined substantially and are projected to become negative during the next few decades. Fueled by oil revenues, staple food consumption has grown at a 3.5 percent pace in North Africa/Middle East (compared to 2.6 percent for production). The situation for this period in Asia is clouded by the fact that India (which accounts for nearly half of both food consumption and production for Asia, excluding the People's Republic of China) experienced no increase in per capita staple food consumption, although the production growth rate increased. But, for the rest of Asia consumption grew by 3.3 percent compared to a 2.9 percent production growth rate.

Thus, countries with high rates of growth of staple food production also tend to have even faster rates of growth of consumption and hence increasing food imports. The relationship is dramatically underlined by the 16 developing countries with the fastest growth rates in food staple production for 1961-76. They more than doubled their net imports of food staples in that same period.

The reason for these surprising relationships is that accelerated growth in a smallholder agriculture generates income increases that stimulate demand for employment-intensive goods and services. The added incomes from such employment are largely spent on food, which combined with additional demand from growth in other sectors, easily surges ahead of the supply growth in the domestic food sector. These relationships hold as long as people have sufficiently low incomes to spend the bulk of that income on food. Generally, broad based, employment-oriented growth does not occur without vigorous growth in agriculture. I will comment further in the next section on the policy measures to make good use of these relationships.

In this context it is important to note the vital role of accelerated growth in livestock consumption and the even more rapid growth in the use of concentrated livestock feeds. This is dramatically illustrated by Taiwan. Taiwan was a net cereals exporter in the early 1950s. It had an excellent growth record in agricultural production in the succeeding three decades, but it now imports 60 percent of all cereals consumed, and practically all of those imports are feedgrains. As incomes rise, consumption of livestock products rises proportionately more. And the relatively fixed supply of traditional livestock feed is quickly used up and cereals are substituted. Thus cereal consumption by livestock rises much faster than livestock production. The critical determinant of the direction of real food prices over the next few decades is the set of forces determining demand for livestock feed in the developing countries and the Soviet Bloc.

## Food Production and Poverty Alleviation

While the most difficult food production problems are now in Africa, the most massive poverty is still in Asia. In Asia, cereal production growth rates have accelerated and commercial imports of cereals have grown, but poverty has persisted. Although the role of cost-decreasing food production technology is central to the processes of poverty abatement, there is much that can be done to increase the effectiveness of such technology in reducing poverty. The role of the CGIAR is important and pervasive in these processes.

The two most powerful forces for poverty reduction in developing countries are increased food production and declining food prices. Each plays a role in increasing the real income of low-income people. The only way both can occur simultaneously is through cost-decreasing technological change in agriculture. Radical redistribution of income without such technological change in agriculture will tend to force food prices up or sharply increase the import bill: the former taking

away with the right hand what the left has given, while the latter may be difficult to finance. Thus a redistribution of income without sharply increased food production is unlikely to be sustainable. The rapid growth of rural populations adds greatly to the urgency of achieving accelerated growth in food production if poverty is to be reduced.

Increased food production without increased employment of the poor will tend to distribute benefits to the poor through lower prices, but those lower prices may stifle the very technological change that provides the increased food supplies. Thus it is important that the employment multipliers nascent in food production growth be fully realized. Unfortunately, how public policy can assist in these processes is one of the least understood aspects of development policy.

However, we have a reasonable basis for the following hypotheses. First, infrastructure development (such as roads, electrification, and communication) seems to be important in encouraging local employment linkages from income-raising technological change in agriculture. These of course also facilitate growth in agriculture itself. Second, although institutional credit has probably not generally played an important role in the growth of these employment-intensive rural activities, it might be able to accelerate those processes, and if so, it will have to be largely for operating capital rather than for fixed capital. Third, services are probably also an important component of rapid growth of rural employment and should be encouraged. Fourth, livestock, fruit, and vegetable products are likely to be an especially important source of increased rural employment as incomes rise, but they require special measures to provide technology, marketing, and financing. Without such attention they are apt to be choked off at great loss of employment.

Two further points should be made about livestock. The underlying production economics suggest a large employment potential but we observe an all too common tendency to use highly capital-intensive methods of production. Rapid growth in livestock production offers an opportunity for rapid growth in the market for "inferior" goods (such as barley, sorghum, and cassava), which are often produced by the very poorest farmers and which face inelastic demand and declining prices in the face of productivity-increasing technology. Thus we need substantial attention to development and application of appropriate livestock technology to meet rapidly growing demand with high employment content production.

Thus if an impact is to be made on the immense poverty problem of Asia, two points must be emphasized.

Most important, the pace of technological change must be maintained or even accelerated. Continued rapid growth in irrigated area is essential as well as research to protect past gains and to provide further gains.

Second, if downward pressure on prices occurs, efforts must be redoubled to increase effective demand for food by raising the real income of the poor through accelerated growth in employment. It is urgent that we expand our knowledge of these processes so that technological change in food production can be accompanied by the appropriate policies for translating that change into increased benefits to the poor.

## Conclusion

I would put a very brief ending to an all-too-terse paper. Improved technology is essential to meeting Africa's immense problems, to creating enlarged markets for agricultural exports of developed countries by accelerating growth in employment and demand that grows out of agricultural success, and to solving the problems of poverty by providing low-cost food and remunerative employment through direct and indirect influences. It is the challenge of the CGIAR to diagram and practice an effective strategy for developing such technology in consort with our colleagues in the national systems.